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Brocade 7800 Extension Switch

Hardware Installation Guide

BROCADE

Contents

Preface

Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

Format	Description
bold text	Identifies command names
	Identifies keywords and operands
	Identifies the names of user-manipulated GUI elements
	Identifies text to enter at the GUI
italic text	Identifies emphasis
	Identifies variables
	Identifies document titles
`Courier font`	Identifies CLI output
	Identifies command syntax examples

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.

Convention	Description
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a “soft” line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE
A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

CAUTION
A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER
A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

You can download additional publications supporting your product at www.brocade.com. Select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to MyBrocade. You can register at no cost to obtain a user ID and password.

Release notes are available on MyBrocade under Product Downloads.

White papers, online demonstrations, and data sheets are available through the Brocade website.

Contacting Brocade Technical Support

As a Brocade customer, you can contact Brocade Technical Support 24x7 online, by telephone, or by e-mail. Brocade OEM customers contact their OEM/Solutions provider.

Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to http://www.brocade.com/services-support/index.html.

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

Online	Telephone	E-mail
Preferred method of contact for non-urgent issues: • My Cases through MyBrocade • Software downloads and licensing tools • Knowledge Base	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • For areas unable to access toll free number: +1-408-333-6061 • Toll-free numbers are available in many countries.	support@brocade.com Please include: • Problem summary • Serial number • Installation details • Environment description

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

- OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
- Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.

- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/Solution Provider.

Document feedback

To send feedback and report errors in the documentation you can use the feedback form posted with the document or you can e-mail the documentation team.

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

- Through the online feedback form in the HTML documents posted on www.brocade.com.
- By sending your feedback to documentation@brocade.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

About this document

Supported hardware and software

Although many different software and hardware configurations are tested and supported by Brocade Communications Systems, documenting all possible configurations and scenarios is beyond the scope of this document.

What's new in this document

The following changes have bee made in this release of the document.

- An illustration indicating the port numbers and the port groups is added.
- A new chapter on removal and replacement of power supplies and fan assemblies is added.
- All references to EIA cabinet have been changed to EIA rack since closed cabinets are not supported by Brocade products.
- The regulatory compliance statements are moved to a new chapter/appendix.
    - The Chinese regulatory statement has been added.
    - China CCC certification has been updated from "GB17625.1-2003 or latest" to "GB17625.1-2012 or latest".
    - Laser compliance statement is removed.
    - The Japan VCCI statement has been updated.
    - China RoHS compliance statements are removed and a reference to the latest independent China RoHS compliance document is added.
- A new chapter/appendix on cautions and danger notices is added with translation in multiple languages.

Introducing the Brocade 7800 Extension Switch

Overview of Brocade 7800 Extension Switch

The Brocade 7800 Extension Switch is intended as a platform for Fibre Channel over IP (FCIP). This enables transmission of Fibre Channel data over long distances via IP networks by wrapping Fibre Channel frames in IP packets. Each end of the FCIP communication path must be a compatible FCIP device, either the Brocade 7800 or the FX8-24 blade in a DCX-family chassis.

A minimum level of Brocade Fabric Operating System (FOS) 6.3 is required to use the Brocade 7800.

Refer to the *Fabric OS Administrator's Guide* for information on configuring these features.

The base model of the switch is shipped with six Fibre Channel SFP ports and two physical Gigabit Ethernet (GbE) ports active. It includes FOS 6.3 and is compatible with the entire Brocade switch family. It can operate independently or in a fabric containing multiple Extension Switches.

A fully licensed Brocade 7800 provides the following functionality features:

- FCIP capability
  - Up to 8 FCIP tunnels.
  - Each FCIP tunnel is represented and managed as a virtual Fibre Channel E_Port (VE_Port).
  - Fibre Channel Routing Services functionality can be used over the FCIP link.
  - Fabrics connected through FCIP merge if the ports are configured as VE_Ports, and do not merge if one end of the connection is configured as a VEx_Port. If VE_Ports are used in a Fibre Channel Routing Services backbone fabric configuration, then the backbone fabric merges but the Ex_Port attached to edge fabrics do not merge. For more information see the *Fabric OS Administrator's Guide*.
- FCIP Trunking with load balancing and network-based failure recovery
- Adaptive Rate Limiting
  - Configurable maximum and minimum committed bandwidth per FCIP tunnel
  - Minimum rate is guaranteed rate
- FC frame compression before FCIP encapsulation
- Fibre Channel Routing
- SO-TCP with reorder resistance
- FastWrite over FCIP (not over FC)
- Open Systems Tape Pipelining over FCIP
- XRC acceleration and FICON tape pipelining over FCIP
- FICON CUP
- FCIP QoS
- TCP performance graphing in Web Tools

The Brocade 7800 provides the following hardware features:

- Up to 16 Fibre Channel SFP ports supporting Fibre Channel Routing Services with link speeds up to 1, 2, 4, or 8 Gbps
- Up to six 1 GbE ports supporting the FCIP and Fibre Channel Routing Services features with transmit link speeds up to 1-Gbps on each port:
  - Two fixed copper RJ-45 ports are provided along with six SFP ports (copper or optical). You can select either the two fixed copper RJ-45 ports or the first two SFP ports (both designated as ge0 and ge1) for use (but not both). The SFP ports can be used with either optical or copper SFPs.
  - The SFP ports can be configured to use either optical or copper cabling.
- Rack mountable 1U chassis.
- One 10/100/1000 Base-T Ethernet port for management interface.
  - This port supports AutoMDI/MDIX.
- One RJ45 terminal port.
- One USB port that provides storage for firmware updates, output of the **supportSave** command and storage for configuration uploads and downloads.
- Two redundant, hot-swappable combined power supply/fan assembly FRUs.
- Five internal temperature sensors.

Brocade 7800 Features

The following table compares features supported on the base and fully upgraded Brocade 7800. It also shows optionally licensed features.

TABLE 1 Feature comparison - Base 7800 and with the Upgrade License

Feature	Base 7800	with Upgrade License
Number of Fibre Channel ports	4	16
Number of GbE ports	2	6
Fibre Channel routing between remote fabrics for fault isolation	Yes[1]	Yes[1]
FCIP Tunnel	Yes	Yes
Number of FCIP tunnels	2	8
FCIP Trunking	Yes[2]	Yes[2]
Adaptive Rate Limiting	Yes[2]	Yes[2]
FC frame compression	Yes	Yes
Storage optimized TCP	Yes	Yes
Fast Write over FCIP tunnel	Yes	Yes
Open Systems Tape Pipelining over FCIP tunnel	No	Yes

[1] Requires IR license
[2] Requires Advanced Extension license

TABLE 1 Feature comparison - Base 7800 and with the Upgrade License (Continued)

Feature	Base 7800	with Upgrade License
FICON XRC emulation and Tape Pipelining over FCIP	No	Yes[3]
FICON CUP	No	Yes[4]

- Before the installation of the Upgrade License, ports beyond the basic four FC and two GbE are shown as *Disabled* with the **switchShow** command.
- On the base 7800, the two SFP ports (ge0 and ge1) can be configured for use with either copper or optical cables.
- FC frame compression is not the same as IP compression and is disabled by default. It can be enabled using the **portCfg** command. For more information see the *Fabric OS Administrator's Guide*.
- FCIP tunnel bandwidth has a minimum rate of 1544 Kbps (T1 rate). Configuration requests of lower rates will be rejected.
- FCIP Trunking is available which will "virtualize" two or more TCP connections (circuits) as part of a single FCIP tunnel. Up to four circuits can be configured for a single FCIP tunnel. See the *Fabric OS Administrator's Guide* for details on explicitly configuring circuits.
- Multiple FCIP tunnels can share the same GbE port. At the same time, VE_ and VEx_Ports are not associated with a single physical GbE port.

Available licenses

The following features are available with the purchase of a specific license key for the Brocade 7800.

- Advanced Extension
- Integrated Routing (IR)
- Advanced Acceleration for FICON
- FICON CUP
- Extended Fabric
- Adaptive Networking
- Server Application Optimization
- ISL Trunking
- Fabric Watch
- Advanced Performance Monitoring

For information on these features, see the *Fabric OS Administrator's Guide*.

Facility requirements

The following table provides the facilities requirements that must be met for the Brocade 7800.

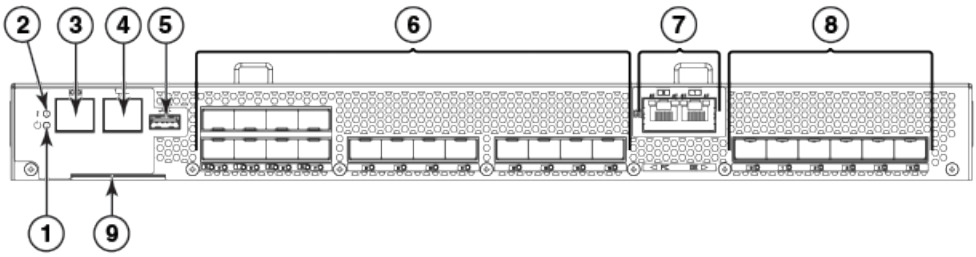
[3] Requires Advanced FICON Acceleration license
[4] Requires FICON CUP license

TABLE 2 Facility requirements

Type	Requirements
Electrical	• Primary AC input 100-240 VAC, 2.0A, 47-63 Hz; switch autosenses input voltage • Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate • Circuit protected by a circuit breaker and grounded in accordance with local electrical codes Refer to Brocade 7800 Technical Specifications on page 0 for complete power supply specifications.
Thermal	• A minimum air flow of 79.8 cubic meters/hour (47 cubic ft/min.) available in the immediate vicinity of the switch • Ambient air temperature not exceeding 40 ° C (104 ° F) while the switch is operating
Rack (when rack-mounted)	• One rack unit (1U) in a 48.3 cm (19-inch) rack • All equipment in rack grounded through a reliable branch circuit connection • Additional weight of switch not to exceed the rack's weight limits • Rack secured to ensure stability in case of unexpected movement

Port side of the Brocade 7800

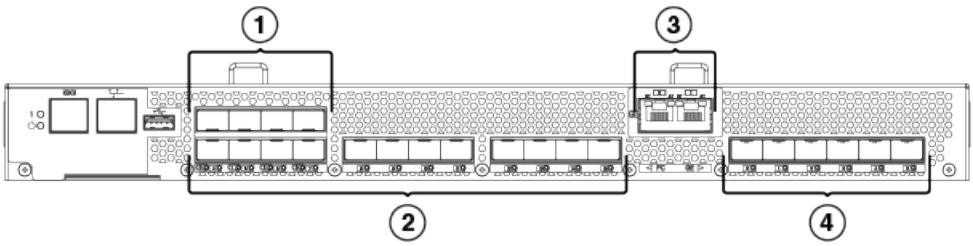
FIGURE 1 Port Side View of the 7800 Extension Switch



1. System Power LED
2. System Status LED
3. Console Port (RJ45)
4. Ethernet Management Port
5. USB Port
6. Fibre Channel Ports (16)
7. GbE ports - copper RJ45(2)
8. GbE ports - optical or copper SFP (6)
9. Serial number pull-out tab

The Fibre Channel ports are numbered from left to right on the faceplate as shown in the following figure:

FIGURE 2 Port numbering in the Brocade 7800 Extension Switch

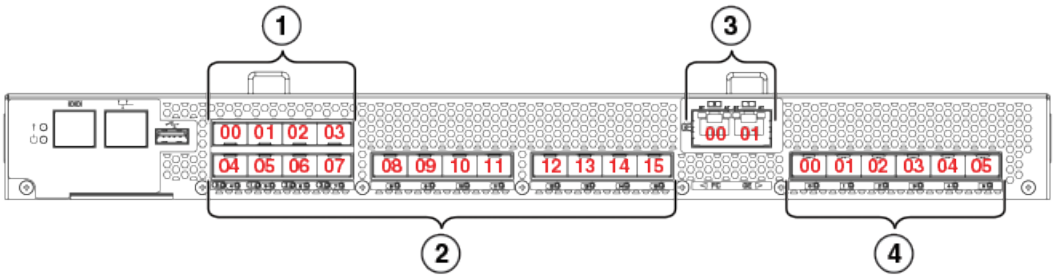


1. Fibre Channel Ports 0 through 3
2. Fibre Channel Ports 4 through 15
3. GbE ports ge0-ge1 (fixed copper RJ-45 only)
4. GbE ports ge0 through ge5 - (SFP - optical or copper)

NOTE
You can also use port index and PIDs to identify a port. For more information, refer to the *Fabric OS Administrator's Guide*.

You can have two trunking groups on a fully licensed Brocade 7800. Groups 1 would consist of FC ports 0-7 and group 2 would be ports 8-15.

FIGURE 3 Trunking port groups and port numbers of the Brocade 7800 Extension Switch

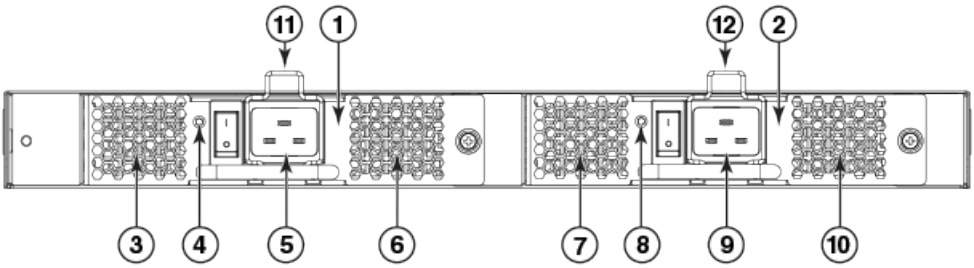


1. Trunking port group 1: FC ports 00-07
2. Trunking port group 2: FC ports 08-15

Nonport side of the Brocade 7800

The following figure shows the nonport side of the Brocade 7800 Extension Switch, which contain the combined power supplies and fans.

FIGURE 4 Nonport side of the Brocade 7800 Extension Switch



1 Fan and Power Supply Assembly 2	7 Fan assembly 1
2 Fan and Power Supply Assembly 1	8 FRU LED
3 Fan assembly 2	9 Power supply 1
4 FRU LED	10 Fan assembly 1
5 Power supply 2	11 FRU handle
6 Fan assembly 2	12 FRU handle

Brocade 7800 management

You can use the management functions built into the Brocade 7800 to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging.

NOTE
The Brocade 7800 automatically perform a power-on self-test (POST) each time it is turned on. Any errors are recorded in the error log. For more information about POST, see POST and boot specifications on page 37.

For information about upgrading the version of Fabric OS installed on your Brocade 7800, see the *Fabric OS Administrator's Guide*

You can manage the Brocade 7800 using any of the management options listed in the following table.

TABLE 3 Management options for the Brocade 7800

Management Tool	Out-of-band Support	In-band Support
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously. For more information, see the *Fabric OS Administrator's Guide* and the*Fabric OS Command Reference*.	Ethernet (preferred) or console port connection	IP over Fibre Channel

TABLE 3 Management options for the Brocade 7800 (Continued)

Management Tool	Out-of-band Support	In-band Support
Brocade Data Center Fabric Manager (DCFM) For information, see the *Data Center Fabric Manager User Manual* .	Ethernet (preferred) or console port connection	IP over Fibre Channel
Brocade Web Tools For information, see the *Web Tools Administrator's Guide*.	Ethernet (preferred) or console port connection	IP over Fibre Channel
Standard SNMP applications For information, see the Fabric OS MIB Reference.	Ethernet (preferred) or console port connection	IP over Fibre Channel
Management Server For information, see the *Fabric OS Administrator's Guide* and the*Fabric OS Command Reference*	Ethernet (preferred) or console port connection	Native in-band interface(over HBA only)

Installing and configuring the Brocade 7800

Installation and safety considerations

You can install the Brocade 7800 in the following ways:

- As a standalone unit on a flat surface.
- In an EIA rack using the fixed rack mount kit, slide rack mount kit, or the mid-mount rack kit.

To install and operate the Brocade 7800 successfully, ensure that the following requirements are met:

- The primary AC input is 100-240 VAC (Brocade 7800 autosenses input voltage), 47-63 Hz.200-240 VAC is recommended.
- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the Brocade 7800 nameplate.

For power supply information, see Brocade 7800 Technical Specifications on page 0 .

To ensure adequate cooling, install the Brocade 7800 with the nonport side, which contains the air intake vents, facing a cool-air aisle.

CAUTION

Make sure the airflow around the front, sides, and back of the device is not restricted.

Verify that the ambient air temperature does not exceed 400° C (104° F) and that the ambient humidity remains between 20% and 85% while the Brocade 7800 is operating.

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°F).

If installing the Brocade 7800 in a rack.

- The rack must be a standard EIA rack.
- Plan a rack space that is 1U (1.75 in.; 4.44 cm), 19 in. (48.3 cm) wide, and at least 24 in. (61cm) deep.
- Ground all equipment in the rack through a reliable branch circuit connection and maintain ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Ensure that airflow and temperature requirements are met on an ongoing basis.

- Verify that the additional weight of the Brocade 7800 does not exceed the rack's weight limits or unbalance the rack in any way.
- Secure the rack to ensure stability in case of unexpected movement.

DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

Installation Precautions

Review all installation precautions before installing the device. Refer to Cautions and Danger Notices on page 57 for translations of all safety notices referenced in this manual.

General precautions

DANGER

The procedures in this manual are for qualified service personnel.

CAUTION

Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

DANGER

All fiber-optic interfaces use Class 1 lasers.

Power precautions

This Extension Switch might have more than one power cord. To reduce the risk of electric shock, disconnect both power cords before servicing.

DANGER

Remove both power cords before servicing.

DANGER

Disconnect the power cord from all power sources to completely remove power from the device.

CAUTION

Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

Connect the power cord only to a grounded outlet.

DANGER

Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.

This product is designed for an IT power system with phase-to-phase voltage of 230V. After operation of the protective device, the equipment is still under voltage if it is connected to an IT power system.

RTC battery precautions

Do not attempt to replace the real-time clock (RTC) battery. Contact your Extension Switch supplier if the real-time clock begins to lose time.

DANGER

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Physical security

The switch must have FIPS seal labels (sold separately) applied to provide physical tamper evident security. For instructions, refer to the *FIPS Security Seal procedure for Switches* .

Items included with the Brocade 7800 Extension Switch

The following items are included with the standard shipment of the Brocade 7800:

- The Brocade 7800 Extension Switch, containing two combined power supply/fan assembly FRUs
- The following rack mount kits are optionally available:
  - Fixed rack mount kit, with installation instructions
  - Slide rack mount kit, with installation instructions
  - Mid-mount kit, with installation instructions
- One accessory kit, containing the following items:
  - *QuickStart Guide*
  - SFP transceivers for Fibre Channel ports:
    - Base model - 4 SWL optical
    - Upgrade model - 16 SWL optical
  - SFP transceivers for the GbE ports - upgrade model - 4 copper or 6 SWL optical (optical SFPs must be 4 Gbps, not 8 Gbps)
  - Rubber mounting feet (to be used when setting up the Extension Switch as a standalone unit)
  - Two grounded 6-ft (approximately 1.83 m) power cords:
    - Power plug type is NEMA5-15
    - Power plug current/voltage rating: 15A/125V
    - Cordage type: SVT
    - Current rating/wire gauge: 10A/ 18AWG

  - Connector at system end of cordset: IEC 60320/ C13
  - Two power cord retainers
- One RJ-45 serial cable, 10-ft (approximately 3 m) long. The Extension Switch uses an RJ-45 connector for the console port. An RJ-45 to DB9 adaptor is also provided with the Brocade 7800.

Setting up the Brocade 7800 Extension Switch as a standalone unit

The Brocade 7800 can be configured as a standalone unit, which means that it resides outside of a rack. Perform the following steps to configure the Brocade 7800 as a standalone unit.

1. Unpack the Brocade 7800 and verify that all ordered items are present.
2. Clean the four corner depressions on the bottom of the Brocade 7800 and place a rubber foot in each one. This helps prevent the Brocade 7800 from accidentally sliding off the supporting surface.
3. Place the Brocade 7800 on a stable, flat surface.

Installing in an EIA rack

The Brocade 7800 Extension Switch can be installed in an EIA rack using one of the following optionally available rack mount kits. Refer to the documentation that is shipped with the rack kit for installation instructions.

- If you purchased the fixed rack mount kit, see the *Fixed Rack Mount Kit Installation Procedure* .
- If you purchased the mid-mount rack kit, see the *Mid-Mount Rack Kit Installation Procedure* .
- If you purchased the slide rack mount kit, see the *Slide Rack Mount Kit Installation Procedure* .

Initial setup of the Brocade 7800

The Brocade 7800 must be configured correctly before it can operate within a network and fabric. For instructions on configuring the Brocade 7800 to operate in a fabric containing Extension Switches from other vendors, see the *Fabric OS Administrator's Guide*.

If you are going to use the Brocade 7800 in a single-switch setup, you can use EZSwitchSetup to complete the basic configuration.

See the *EZSwitchSetup CD* , included with the Brocade 7800, for more information.

If you do not want to use EZSwitchSetup, follow the instructions in the rest of this section.

The following items are required for configuring and connecting the Brocade 7800 for use in a network and fabric:

- The Brocade 7800, installed and connected to a power source
- A workstation computer that has a terminal emulator application (such as HyperTerminal for Windows)
- An unused IP address and corresponding subnet mask and gateway address
- The serial cable provided with the Brocade 7800
- An Ethernet cable

- SFP transceivers and compatible fiber and/or copper cables, as required
- Access to an FTP server, for backing up (uploading) or downloading the Brocade 7800 configuration

To configure the Brocade 7800, you must perform the following tasks:

NOTE
Do not connect the Brocade 7800 to the network until the IP address is correctly set.

Providing power to the switch

Perform the following steps to provide power to the Brocade 7800.

1. Connect the power cords to both power supplies and then to power sources on separate circuits to protect against AC failure. Ensure that the cords have a minimum service loop of 6 in. available and are routed to avoid stress.
2. Power on the power supplies by flipping both AC switches to the "I" symbol. The power supply LEDs display amber until POST is complete, and then change to green. The Extension Switch usually requires from 1 to 3 minutes to boot and complete POST.

NOTE
Power is supplied to the switch as soon as the first power supply is connected and turned on.

3. After POST is complete, verify that the Brocade 7800 power and status LEDs on the left of the port side of the switch are green.

Creating a serial connection

Perform the following steps to create a serial connection to the Brocade 7800.

1. Remove the plug from the console (serial) port and insert the serial cable provided with the Brocade 7800.
2. Connect the serial cable to the console port on the Brocade 7800 and to an RS232 serial port on the workstation. If the serial port on the workstation is RJ45 instead of RS232, you can remove the adapter on the end of the serial cable and insert the exposed RJ45 connector into the RJ45 serial port on the workstation.

3. Disable any serial communication programs running on the workstation.
4. Open a terminal emulator application (such as HyperTerminal for Windows or TERM in a UNIX environment) and configure the application as follows:
   - In a Windows environment:
     - Bits per second: 9600
     - Databits: 8
     - Parity: None
     - Stop bits: 1
     - Flow control: None
   - In a UNIX environment, enter the following command at the prompt:

     ```
     tip /dev/ttyb -9600
     ```

     If ttyb is already in use, use ttya instead and enter the following string at the prompt:

     ```
     tip /dev/ttya -9600
     ```

Connecting to the Brocade 7800 using the serial connection

Perform the following steps to log in to the switch through the serial connection.

1. Verify that the switch has completed POST. When POST is complete, the port status and switch power and status LEDs return to a standard healthy state.
2. Connect the serial cable to the serial port on the switch and to an RS-232 serial port on the workstation.

   If the serial port on the workstation is RJ45 instead of RS-232, remove the adapter on the end of the serial cable and insert the exposed RJ45 connector into the RJ45 serial port on the workstation.
3. When the terminal emulator application stops reporting information, press **Enter** to display the login prompt.
4. Log in to the switch as **admin**, using the default password: **password**. You are prompted to change the default passwords at initial login.
5. Configure the application as follows:
   - In a Windows environment:

Parameter	Value
Bits per second	9600
Databits	8
Parity	None
Stop bits	1
Flow control	None

   - In a UNIX environment using TIP, enter the following string at the prompt:

     ```
     tip /dev/ttyb -9600.
     ```

     If ttyb is already in use, use ttya instead and enter the following string at the prompt:

     ```
     tip /dev/ttya -9600
     ```

Setting the switch IP address

You can configure the Brocade 7800 with a static IP address, or you can use a DHCP (Dynamic Host Configuration Protocol) server to set the IP address of the switch. DHCP is enabled by default. The Brocade 7800 supports both IPv4 and IPv6.

Using DHCP to set the IP address

When using DHCP, the Brocade 7800 obtains its IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the Brocade 7800, use a static IP address.

Setting a static IP address

1. Log into the switch using the default password, which is password.
2. Use the **ipaddrset** command to set the Ethernet IP address.

   If you are going to use an IPv4 IP address, enter the IP address in dotted decimal notation as prompted.

   ```
   Ethernet IP Address: [192.168.74.102]
   ```

   If you are going to use an IPv6 address, enter the network information in colon-separated notation as prompted.

   ```
   switch:admin> ipaddrset -ipv6 --add 1080::8:800:200C:417A/64
   IP address is being changed...Done.
   ```
3. Complete the rest of the network information as prompted. (IPv4 format shown)

   ```
   Ethernet Subnetmask: [255.255.255.0]
   Ethernet IP Address: [192.168.74.102]
   Ethernet Subnetmask: [255.255.255.0]
   ```
4. Enter off to Disable DHCP when prompted.

   ```
   DHCP [OFF]: off
   ```

Changing the switch name and chassis name

Changing the switch and chassis names are important for accurate tracking of errors in the RASlog. The messages that appear in the log will be labelled with the switch or chassis name, which makes tracking the errors much easier. Choose an easily understandable and meaningful name for each.

Perform the following steps to change the chassis name and then the switch name.

1. Log on to the switch through Telnet, using the admin account.
2. Change the chassis name by using the **chassisName** command.

   ```
   switch:admin> chassisname my7800chassis
   switch:admin> chassisname
   my7800chassis
   ```
3. Change the switch name by using the **switchName** command.

   ```
   switch:admin> switchname my7800switch
   switch:admin> switchname
   my7800switch
   ```

Creating an Ethernet connection

Perform the following steps to create an Ethernet connection to the Brocade 7800.

1. Remove the plug from the Ethernet port.
2. Connect an Ethernet cable to the switch Ethernet port and to the workstation or to an Ethernet network containing the workstation.

NOTE
At this point, the Brocade 7800 can be accessed remotely, by command line or by Web Tools. Ensure that the switch is not being modified from any other connections during the remaining tasks.The Ethernet management port also supports AutoMDI/MDIX.

Setting the Brocade 7800 domain ID

Perform the following steps to set the switch domain ID.

1. Log on to the switch through Telnet, using the admin account.
2. Modify the domain ID if required.

   The default domain ID is 1. If the switch is not powered on until after it is connected to the fabric and the default domain ID is already in use, the domain ID for the new switch is automatically reset to a unique value. If the switch is connected to the fabric after it has been powered on and the default domain ID is already in use, the fabric segments. To find the domain IDs that are currently in use, run the **fabricShow** command on another Extension Switch in the fabric.

   a) Disable the Brocade 7800 by entering the **switchDisable** command.
   b) Enter the **configure** command. The command prompts display sequentially; enter a new value or press **Enter** to accept each default value.
   c) Enter **y** after the "Fabric param" prompt:

      ```
      Fabric param (yes, y, no, n): [no] y
      ```

   d) Enter a unique domain ID (such as the domain ID used by the previous Extension Switch, if still available):

      ```
      Domain: (1..239) [1] 3
      ```

   e) Complete the remaining prompts or press Ctrl-D to accept the remaining settings without completing all the prompts.
   f) Re-enable the switch by entering the **switchEnable** command.

Setting the Brocade 7800 date and time

The date and time switch settings are used for logging events. Switch operation does not depend on the date and time; a switch with incorrect date or time values still functions properly.

You can synchronize the local time of the principal or primary fabric configuration server (FCS) switch to that of an external Network Time Protocol (NTP) server.

Perform the following steps to set the date and time of a Brocade 7800.

1. Log in to the switch as admin.
2. Enter the **date** command at the command line using the following syntax:

   ```
   date "MMDDhhmm[CC]YY"
   ```

   where:

- MM is the month (01-12)
- DD is the date (01-31)
- hh is the hour (00-23)
- mm is minutes (00-59)
- CC is the century (19-20)
- YY is the year (00-99)

Year values greater than 69 are interpreted as 1970-1999; year values less than 70 are interpreted as 2000-2069. The date function does not support Daylight Savings Time or time zones, so changes will have to be reset manually.

```
switch:admin> date
Fri May  5 21:50:00 UTC 1989
switch:admin>
switch:admin> date "0624165203"
Tue Jun 24 16:52:30 UTC 2003
switch:admin>
```

Synchronizing local time with an external source

Perform the following steps to synchronize the local time of the principal or primary FCS switch with that of an external NTP server.

1. Log in as admin.
2. Enter the **tsClockServer***ipaddr* command.

   The *ipaddr* variable represents the IP address of the NTP server that the Brocade 7800 can access. This argument is optional; by default the value is "LOCL".

```
sw7800:admin> tsclockserver 192.168.126.60
Updating Clock Server configuration...done.
Updated with the NTP servers
sw7800:admin>
```

Correcting the time zone of a Brocade 7800

If the time of your switch is off by hours (and not minutes), use the following procedure to set the time zone.

1. Log in as admin.
2. You can use the **tstimezone -interactive** command and follow the prompts or enter the **tsTimeZone** command as follows:

   ```
   tstimezone  [houroffset [, minuteoffset]]
   ```

   For Pacific Standard Time, enter **tsTimeZone -8,0**

   For Central Standard Time, enter **tsTimeZone -6,0**

   For Eastern Standard Time, enter **tsTimeZone -5,0**

   The default time zone for switches is universal time conversion (UTC), which is 8 hours ahead of Pacific Standard Time. Additional time zone conversions are listed later in this section.

   The parameters listed do not apply if the time zone of the switches has already been changed from the default (8 hours ahead of PT).

   For more detailed information about the command parameters, see the **tsTimeZone** command in the *Fabric OS Command Reference*.

   This needs to be done only once, because the value is stored in nonvolatile memory. For U.S. time zones, use the following table to determine the correct parameter for the tsTimeZone command.

TABLE 4 tsTimeZone command parameter selection

Local Time	tsTimeZone parameter (difference from UTC)
Atlantic Standard	-4,0
Atlantic Daylight	-3,0
Eastern Standard	-5,0
Eastern Daylight	-4,0
Central Standard	-6,0
Central Daylight	-5,0
Mountain Standard	-7,0
Mountain Daylight	-6,0
Pacific Standard	-8,0
Pacific Daylight	-7,0
Alaskan Standard	-9,0
Alaskan Daylight	-8,0
Hawaiian Standard	-10,0

FCIP and Fibre Channel routing services configuration

The ports on the Brocade 7800 are initially set to persistently disabled.

If you want to enable the FC ports as a standard E_Port or F_port use the **portcfgpersistentenable** command to enable the ports.

If you are using the FC ports as EX_Ports you must configure the Fibre Channel Routing Services feature prior to enabling the ports.

The GbE ports can only be used once you have configured FCIP and enabled the VE_Ports.

See the *Fabric OS Administrator's Guide* for detailed instructions on configuring the Fibre Channel Router ports and GbE ports on the Brocade 7800.

Installing SFPs and cabling the Brocade 7800

Perform the following steps to install SFPs and cable the switch.

1. Install the SFP transceivers in the Fibre Channel ports, as required. The ports selected for use in trunking groups must meet specific requirements. For a list of these requirements, see the *Fabric OS Administrator's Guide*.
   a) Remove the plugs from the ports to be used.
   b) Position a transceiver so that it is oriented correctly and insert it into a port until it is firmly seated and the latching mechanism clicks.

For instructions specific to the type of transceiver, see the transceiver manufacturer's documentation.

NOTE
The transceivers are keyed to ensure correct orientation. If a transceiver does not install easily, ensure that it is correctly oriented.

c) Repeat steps a and b for the remaining ports, as required.

2. If you have chosen to use the optical ports for ge0 and ge1, install those SFPs. If you have licensed the additional GbE ports, install the SFP transceivers in GbE ports ge2 through ge5.
   a) Remove the plugs from the ports to be used.
   b) Position a transceiver so that it is oriented correctly and insert it into a port until it is firmly seated and the latching mechanism clicks. Be sure that you are using Brocade-branded 4 Gbps SFPs in the GbE ports.
   c) Use the **portcfggemediatype** command to configure ge0 and ge1 to either copper or optical.

      For instance, to select the optical option for port ge0, use the following command.

      ```
      switch:admin> portcfggemediatype ge0 optical
      ```

3. Connect the cables to the transceivers.

   The cables used in trunking groups must meet specific requirements. For a list of these requirements, see the *Fabric OS Administrator's Guide*.

   NOTE
   A 50-micron cable should not be bent to a radius less than 2 in. under full tensile load and 1.2 in. with no tensile load. Tie wraps are not recommended for optical cables because they are easily overtightened.

   a) Orient a cable connector so that the key (the ridge on one side of connector) aligns with the slot in the transceiver. Then, insert the cable into the transceiver until the latching mechanism clicks. For instructions specific to cable type, see the cable manufacturer's documentation.

      NOTE
      The cable connectors are keyed to ensure correct orientation. If a cable does not install easily, ensure that it is correctly oriented.

   b) Repeat Step a for the remaining cables as required.
   c) If you have chosen the copper option for GbE ports ge0 and ge1, you can install those cables now.

4. Check the LEDs to verify that all components are functional. For information about LED patterns, see the LED patterns section.
5. Verify the correct operation of the Brocade 7800 by entering the **switchShow** command from the workstation.

Verifying correct operation and backup the configuration

Perform the following steps to verify correct operation and backup with Brocade 7800 configuration.

1. Check the LEDs to verify that all components are functional. For information about LED patterns, see the LED patterns section.
2. Run the **portcfgpersistentenable** command to activate the FC ports for FC operation.
3. Verify the correct operation of the Brocade 7800 by entering the **switchShow** command from the workstation.

   This command provides information about switch and port status.

```
sw7800:admin> switchshow
switchName:     sw7800
switchType:     83.3
switchState:    Online
switchMode:     Native
switchRole:     Principal
switchDomain:   220
switchId:       fffcdc
switchWwn:      10:00:00:05:1e:55:a2:00
zoning:         ON (DEFAULT_CFG_LSAN)
switchBeacon:   OFF
FC Router:      ON
FC Router BB Fabric ID: 1
Index Port Address Media Speed State     Proto
==============================================
  0   0   dc0000   id    N8   No_Light    FC
  1   1   dc0100   id    N8   No_Light    FC
  2   2   dc0200   id    N8   No_Light    FC
  3   3   dc0300   id    N8   No_Light    FC
  4   4   dc0400   --    N8   No_Module   FC
  5   5   dc0500   --    N8   No_Module   FC
  6   6   dc0600   --    N8   No_Module   FC
  7   7   dc0700   --    N8   No_Module   FC
  8   8   dc0800   id    N8   No_Light    FC
  9   9   dc0900   --    N8   No_Module   FC
 10  10   dc0a00   id    N8   No_Light    FC
 11  11   dc0b00   id    N8   No_Light    FC
 12  12   dc0c00   id    N8   No_Light    FC
 13  13   dc0d00   id    N8   No_Light    FC
 14  14   dc0e00   id    N8   No_Light    FC
 15  15   dc0f00   id    N8   No_Light    FC
 16  16   dc1000   --    --   Offline     VE
 17  17   dc1100   --    --   Offline     VE
 18  18   dc1200   --    --   Offline     VE
 19  19   dc1300   --    --   Offline     VE
 20  20   dc1400   --    --   Offline     VE
 21  21   dc1500   --    --   Offline     VE
 22  22   dc1600   --    --   Offline     VE
 23  23   dc1700   --    --   Offline     VE
     ge0  id    1G   No_Light  FCIP
     ge1  id    1G   No_Light  FCIP
     ge2  id    1G   No_Light  FCIP
     ge3  id    1G   No_Light  FCIP
     ge4  id    1G   No_Light  FCIP
     ge5  id    1G   No_Light  FCIP
sw7800:admin>
```

4. Verify the correct operation of the Brocade 7800 in the fabric by entering the **fabricShow** command from the workstation.

   This command provides general information about the fabric.

5. Back up the switch configuration to an FTP server by entering the **configUpload** command and following the prompts.

```
sw7800:admin> configupload
Protocol (scp, ftp, local) [ftp]:
Server Name or IP Address [host]: 192.168.0.100
User Name [user]: anonymous
Path/Filename [<home dir>/config.txt]:
Section (all|chassis|switch [all]): all
configUpload complete: All selected config parameters are uploaded
sw7800:admin>
```

   This command uploads the switch configuration to the server, making it available for downloading to a replacement switch if necessary.

Brocade recommends backing up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement Brocade 7800. For specific instructions about how to back up the configuration, see the *Fabric OS Administrator's Guide*. The **switchShow** , **fabricShow** , and **configUpload** commands are described in detail in the *Fabric OS Command Reference*

Recommendations for cable management

Cables can be organized and managed in a variety of ways, such as by using cable channels or patch panels. Note the following recommendations:

- Plan cable management before installing the Brocade 7800 in a rack.
- Leave at least one meter (three feet) of slack for each port cable. This provides room to remove and replace the Brocade 7800, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.

NOTE
A 50-micron cable should not be bent to a radius less than 2 in. under full tensile load and 1.2 in. with no tensile load. Tie wraps are not recommended for optical cables because they are easily overtightened.

Operating the Brocade 7800 Extension Switch

LED activity

System activity and status can be determined through the activity of the LEDs on the Extension Switch.

There are three possible LED states:

- No light
- Steady light
- Flashing light

Active lights are in one of the following colors:

- Green
- Amber

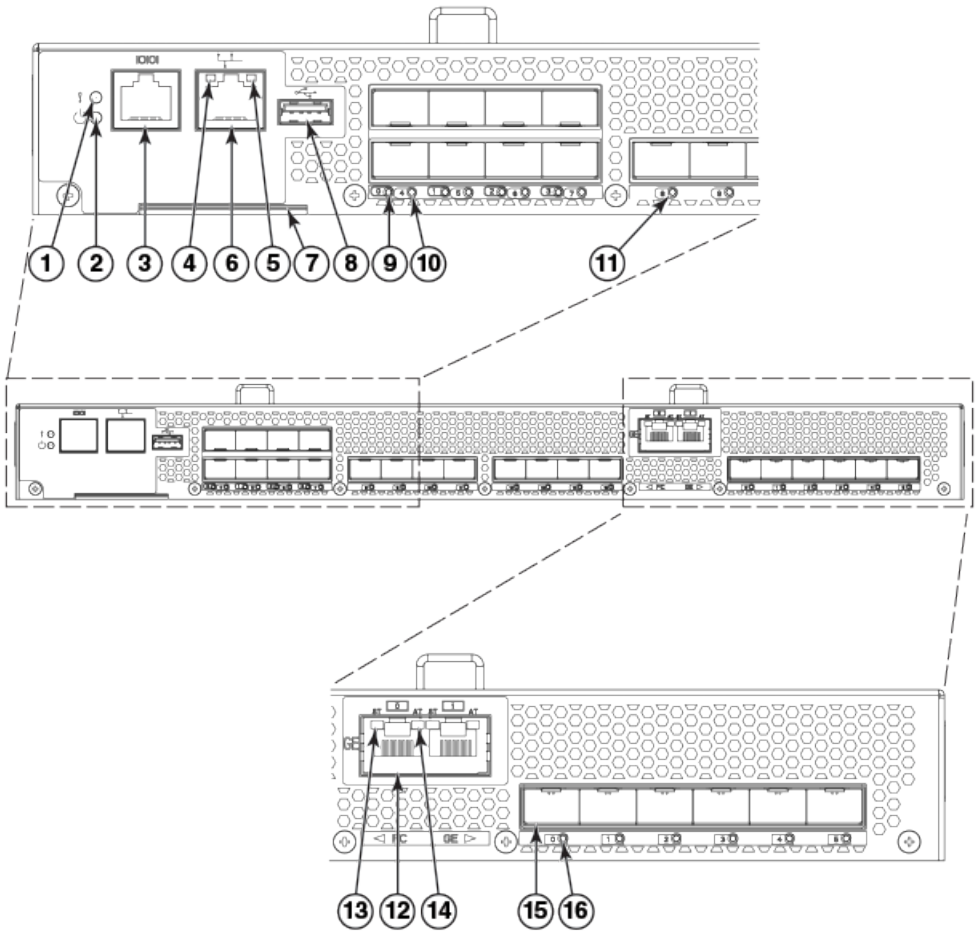
The status LEDs may display solid amber or flash during boot, POST, or other diagnostic tests. This is normal; it does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete.

LEDs on the port side of the Extension Switch

The port side of the Extension Switch has the following LEDs:

- One system status LED (above) on the left side.
- One power status LED (below) on the left side.
- Management Ethernet port speed and activity LEDs.
- One port status LED for each Fibre Channel port on the Extension Switch. The port LEDs are located in the array in the same relative positions as the ports.
- One port status LED for each optical GbE port.
- Two LEDs for each fixed copper RJ-45 GbE port, one activity/status LED and one fault LED.

FIGURE 5 LEDs on port side



1 System Status LED	9 Port 0 Status LED
2 System Power LED	10 Port 4 Status LED
3 Console Port	11 Port 8 Status LED
4 Ethernet Link LED	12 GbE Fixed Copper Port
5 Ethernet Status LED	13 GbE Port 0 Fault (FLT)LED
6 Ethernet Port	14 GbE Port 0 Status/Activity LED
7 IP Address Pull Out Tab	15 GbE SFP Optical or Copper Port
8 USB Port	16 GbE SFP Port Dual Color LED

The following table describes the LEDs and their actions on the port side of the Extension Switch.

TABLE 5 Port Side LED patterns during normal operation

LED Name	LED Color	Status of Hardware	Recommended Action
Power Status	No light	System is off or there is an internal power supply failure.	Verify that system is powered on (power supply switches to "1"), the power cables attached, and your power source is live. If the system power LED is not green, the unit may be faulty. Contact your Extension Switch service provider.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System Status	No light	System is off or there is no power.	Verify that system is on and has completed booting.
	Steady green	System is on and functioning properly.	No action required.
	Steady amber (for more than five seconds)	Unknown state, boot failed, or the system is faulty. This LED displays steady amber during POST; this is normal and does not indicate a fault.	Perform the following steps: 1. Connect a serial cable to the system. 2. Reboot the system. 3. Check the failure indicated on the system console 4. Contact your Extension Switch service provider.
	Flashing amber/ green	Attention is required. A number of variables can cause this status including a single power supply failure, a fan failure, or one or more environmental ranges has exceeded.	Check the management interface and the error log for details on the cause of status. Contact your Extension Switch service provider.
Ethernet Link	No light	There is no link.	Verify that the Ethernet cable is connected correctly.
	Steady green	There is a link	No action required.
Ethernet Status/ Activity	No light	No activity	No action required.
	Flashing green	There is link activity (traffic).	No action required.
FC Port Status	No light	Indicates one of the following: • No signal or light carrier (media or cable) detected. • Blade may be currently initializing. • Connected device is configured in an offline state.	• Verify the power LED is on, and check the SFP and cable. • Verify the blade is not currently being initialized. • Verify the status of the connected device.

TABLE 5 Port Side LED patterns during normal operation (Continued)

LED Name	LED Color	Status of Hardware	Recommended Action
	Steady green	Port is online (connected to external device) but has no traffic.	No action required.
	Slow-flashing green (on 1 second; then off 1 second)	Port is online but segmented because of a loopback cable or incompatible Extension Switch connection.	Verify that the correct device is attached to the switch.
	Fast-flashing green (on 1/4 second; then off 1/4 second)	Port is online and an internal loopback diagnostic test is running.	No action required.
	Flickering green	Port is online and frames are flowing through the port.	No action required.
	Steady amber	Port is receiving light or signal carrier, but it is not online yet.	No action required.
	Slow-flashing amber (on 2 seconds; then off 2 seconds)	Port is disabled because of diagnostics or the **portDisable** command.	Reset the port. The **portCfgPersistentDisable** command is persistent across reboots.
	Fast-flashing amber (on 1/2 second; then off 1/2 second)	SFP or port is faulty.	Reset the port. Replace the SFP. Must be a Brocade-branded SFP.
GbE Optical/ Copper Port Status	No light (LED is off)	Port is offline.	Verify that the power LED is on, check the transceiver and cable.
	Steady green	Port is online but has no traffic.	No action required.
	Flickering green	Port is online, with traffic flowing through port.	No action required.
	Steady amber	Port is faulty.	Change the transceiver or reset the switch from the workstation.
GbE Fixed Copper Port Status2 LEDs per port - one green, one amber	No lights (both LEDs are off)	Port is offline.	Verify that the power LED is on, check the transceiver and cable.
	Steady green, amber off	Port is online but has no traffic.	No action required.
	Flickering green, amber off	Port is online, with traffic flowing through port.	No action required.
	Green off, steady amber	Port is faulty.	Reset the switch from the workstation. If the fault persists, use the other fixed copper port or the optical/copper SFP ports or return the switch for repair

LEDs on the nonport side of the Brocade 7800

The nonport side of the Brocade 7800 has the following LEDs:

- One power supply LED next to the AC power switch on each fan and power supply assembly. See Nonport side of the Brocade 7800 on page 15 for a diagram of the non-port side of the switch.

The following table describes the LEDs on the nonport side of the Extension Switch.

TABLE 6 Nonport Side LED patterns during normal operation

LED Name	LED Color	Status of Hardware	Recommended Action
Power Supply/ Fan Status	No light	Power supply is not seated correctly.	Verify that the power supply is seated correctly.
	Steady green	System is on and power supplies are functioning properly.	No action required.
	Flashing green	Fault has occurred in the FRU.	Try the following: • Check the power cable connection. • Verify that the power supply is powered on. • Run **psShow** and **fanShow** commands to determine the source of the fault. • Replace the FRU.

POST and boot specifications

The Brocade 7800 runs POST by default each time it is powered on; it typically requires from 1 to 3 minutes to boot and complete POST.

POST can be skipped after subsequent reboots by entering the **fastBoot** command. For more information about this command, see the *Fabric OS Command Reference*.

POST

The success/fail results of the diagnostic tests that run during POST can be monitored through LED activity, the error log, or a command line interface.

POST includes the following tasks:

1. Conduct preliminary POST diagnostics
2. Initialize the operating system
3. Initialize hardware
4. Run diagnostic tests on several functions, including circuitry, port functionality, memory, statistics counters, and serialization

Boot

In addition to POST, boot includes the following tasks after POST is complete:

1. Perform universal port configuration
2. Initialize links
3. Analyze fabric. If any ports are connected to other Extension Switches, the Extension Switch participates in a fabric configuration
4. Obtain a domain ID and assigning port addresses
5. Construct unicast routing tables
6. Enable normal port operation

Interpreting POST results

POST is a system check that is performed each time the Brocade 7800 is powered on, rebooted, or reset, and during which the LEDs flash different colors.

Perform the following steps to determine whether POST completed successfully and whether any errors were detected.

1. Verify that the LEDs on the switch indicate that all components are healthy (LED patterns are described in LEDs on the port side of the Extension Switch on page 33 and LEDs on the nonport side of the Brocade 7800 on page 37). If one or more LEDs do not display a healthy state:
   a) Verify that the LEDs are not set to "beacon" (this can be determined through the **switchShow** command or Web Tools). For information about how to turn beaconing on and off, see the *Fabric OS Administrator's Guide* or the *Web Tools Administrator's Guide*.
   b) Follow the recommended action for the observed LED behavior, as listed in LEDs on the port side of the Extension Switch on page 33 or LEDs on the nonport side of the Brocade 7800 on page 37.
2. Verify that **diagShow** command displays that the diagnostic status for all ports in the switch is OK.
3. Review the system log for errors. Errors detected during POST are written to the system log, which is viewed using the **errShow** command. For more information about this command, see the *Fabric OS Command Reference*. For information about specific error messages, see the *Fabric OS Message Reference*.

Brocade 7800 maintenance

The Brocade 7800 are designed for high availability and low failure; it does not require any regular physical maintenance. It includes diagnostic tests and field-replaceable units, described in the following sections.

Diagnostic tests

In addition to POST, Fabric OS includes diagnostic tests to help you troubleshoot the hardware and firmware. This includes tests of internal connections and circuitry, fixed media, and the transceivers and cables in use. The tests are implemented by command, either through a Telnet session or through a terminal set up for a serial connection to the Extension Switch. Some tests require the ports to be

connected by external cables, to allow diagnostics to verify the serializer/deserializer interface, transceiver, and cable. Some tests require loop back plugs.

Diagnostic tests are run at link speeds of 1-Gbps, 2-Gbps, 4-Gbps, and 8-Gbps. For information about specific diagnostic tests, see the *Fabric OS Administrator's Guide*.

NOTE
Diagnostic tests might temporarily lock the transmit and receive speed of the links during diagnostic testing. Brocade recommends that you power-cycle the switch after completing offline diagnostics tests.

Field replaceable units (FRUs)

You can replace the combined power supply/fan assemblies on site without the use of special tools. The FRUs are keyed to ensure correct orientation during installation. Replacement instructions are provided with all replacement units ordered.

DANGER
Remove both power cords before servicing.

DANGER
Disconnect the power cord from all power sources to completely remove power from the device.

Power supplies/fan assemblies

The two FRUs are hot-swappable. They are identical and fit into either bay. They are keyed to prevent being inserted upside down.

Fabric OS identifies the power supplies as follows (viewing the Brocade 7800 from the nonport side):

- Power supply #1 on the right
- Power supply #2 on the left

Fabric OS identifies the fan assemblies as follows (viewing the Brocade 7800 from the nonport side):

- Fan assembly #1 on the right
- Fan assembly #2 on the left

The FRUs are cross connected so that if one power supply fails the fans will continue to run on power from the other power supply.

Any of the following methods can be used to determine whether a FRU requires replacing:

- Check the status LED next to the On/Off switch (see LEDs on the nonport side of the Brocade 7800 on page 37).
- In DCFM, double click the 7800 switch icon to open Web Tools, then click the **Power Status** icon.
- Enter the **psShow** command at the command prompt to display power supply status.
- In DCFM, double click the 7800 switch icon to open Web Tools, then click the **Fan Status** icon.
- Enter the **fanShow** command at the command prompt.

See the *Combined Power Supply and Fan Assembly Replacement Procedure* for information on how to change the FRU.

Powering off the switch

Perform the following steps to power off the switch.

1. Run the **sysShutdown** command.

   This command not only shuts down the key processors but also powers off the switch and all LEDs will go dark.
2. Set each AC power switch to "0".

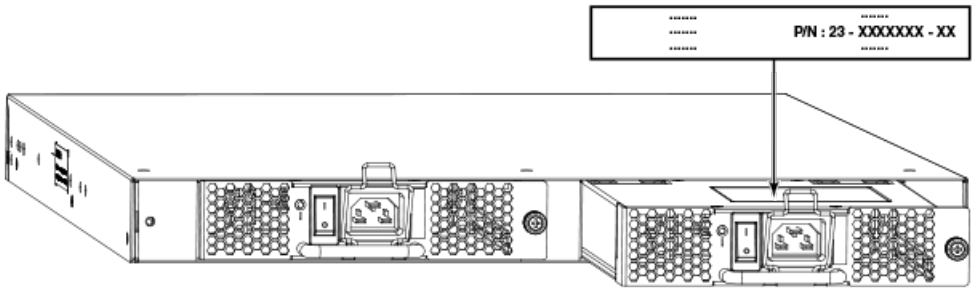
Removal and Replacement of Combined Power Supply and Fan Assembly (Port-side Air Exhaust)

Before beginning installation

This section describes how to change a power supply/fan assembly for a unit with a port-side air exhaust. A new power supply/fan assembly field replaceable unit (FRU) must have the same part number (P/N) as the FRU being replaced. The manufacturing P/N is located on the top of the power supply/fan assembly.

Using the same P/N for all power supply/fan assembly FRUs ensures identical airflow for all the FRUs on the chassis. The power supply/fan assembly unit handle color is also an indicator of the model type. The handles for the installed FRUs must be the same color.

FIGURE 6 Power supply and fan assembly with part number



Installing a combined power supply and fan assembly FRU

The following figure shows the two combined power supply and fan assemblies. Fabric OS identifies the FRUs from left to right as fan assembly #2 and fan assembly #1.

FIGURE 7 Power supply and fan assemblies on the non-port side

Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

CAUTION

Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Because the cooling system relies on pressurized air, do not leave any of the fan assembly slots empty longer than two minutes while the switch is operating. If a fan assembly fails, leave it in the switch until it can be replaced. Maintain all fan assemblies in operational condition to provide redundancy.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

The following table describes the power supply/fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 7 LED behavior, description, and required actions

LED color and behavior	Description	Action required
No light	Power supply and fan assembly is not receiving power.	Verify that the power supply and fan assembly FRU is seated correctly.
Steady green	Power supply and fan assembly is operating normally.	No action required.
Flashing green (for more than five seconds)	A power supply and fan assembly fault has occurred for one of the following reasons: • The power supply or fan in the assembly has failed. • The FRU was disabled by a user. • The FRU power switch has been turned off or the unit has been unplugged.	Take one of the following actions: • Replace the FRU. • Verify that the power supply/fan assembly FRU is enabled. • Check the power switch and plug.

Time required

Replacing a fan assembly in the switch should take less than two minutes.

Items required

You need the following items to replace a power supply and fan assembly.

- New power supply and fan assembly FRU.
- Phillips-head screwdriver #1.

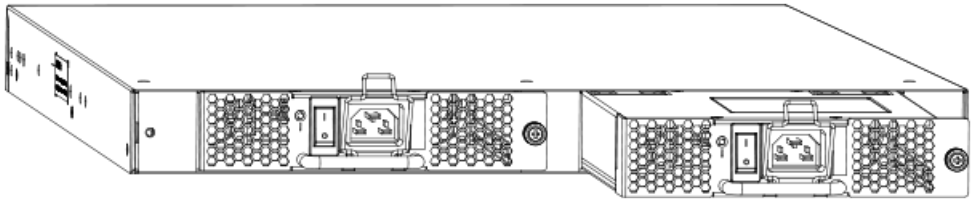
Replacing the power supply/fan assembly

Complete the following steps to replace a power supply and fan assembly.

1. Unscrew the captive screw on the power supply/fan assembly you are replacing using a Phillips-head screwdriver.
2. Remove the power supply/fan assembly from the chassis by pulling the handle out, away from the chassis.
3. Confirm that the new power supply/fan assembly has the same part number as the removed one.

4. Install the new power supply/fan assembly in the chassis:
   a) Orient the new fan assembly as shown in the following figure, with the captive screw on the right.

FIGURE 8 Orientation of the power supply and fan assembly FRU



   b) Gently push the power supply/fan assembly into the chassis until it is firmly seated.

NOTE
Do not force the installation. If the FRU does not slide in easily, ensure that it is correctly oriented before continuing.

CAUTION
Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

   c) Secure the power supply/fan assembly to the chassis by screwing in the captive screw using the Phillips-head screwdriver.
5. Verify that the fan status LED is lit steady green to indicate normal operation.
6. Optionally, display the fan status using the **fanShow** command from the CLI.

Brocade 7800 Extension Switch Technical Specifications

This document highlights the features and specifications for the Brocade 7800 Extension Switch.

System specifications

System component	Description
Enclosure	1U, 19-inch EIA-compliant, power from back
Power inlet	C13
Power supplies	Three power supplies with AC switches and built-in fans.
Fans	Two fan assemblies
Cooling	Back-to-front airflow
System architecture	Nonblocking shared memory extension switch
System processors	PowerPC 440EPx, 667 MHz CPU GoldenEye2 switch ASIC Cavium CN5470 750 MHz processor Blaster FPGA

Fibre Channel

System component	Description
Fibre Channel ports	16 ports compatible with short wavelength (SWL), long wavelength (LWL), and extended long wavelength (ELWL) SFP transceivers
ANSI Fibre Channel protocol	Fibre Channel Physical and Signaling Interface standard (FC-PH)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6
FCIP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile

Ethernet

System component	Description
SFP GbE ports	Six optical or copper, compatible with short wavelength (SWL), long wavelength (LWL), extended long wavelength (ELWL), or copper SFP transceivers
Ethernet management port	One RJ-45 with 10/100/1000 Mbps auto-negotiating capability

LEDs

System component	Description
System power LED	One power status LED
System status LED	One system status LED
Ethernet port LED	Two Ethernet port LEDs
FRU LED	Two combined power supply/fan assembly FRUs LEDs
Port status LED	16 Fibre Channel 6 optical or copper GbE Two LEDs (one each for fault and status/activity)

Other

System component	Description
Serial cable	One IEEE-compliant RJ-45 serial cable
RJ-45 to DB9 adapter	1
RJ-45 connector	1

Weight and physical dimensions

Model	Height	Width	Depth	Weight
Brocade 7800 Extension Switch	4.45 cm 1.75 in	43.18 cm 17 in	64.14 cm 25.25 in	10.9 kg 24 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0º to 40ºC (32º to 104ºF)	-25º to 70ºC (-13º to 158ºF)
Relative humidity (non-condensing)	10% to 85% at 40ºC (104ºF)	10% to 90% at 70ºC (158ºF)
Altitude (above sea level)	0 to 3,000 m (10,000 ft)	0 to 12,000 m (40,000 ft)
Shock	20 G, 6 ms, half-sine wave	15 G, 12-18 ms, trapezoid
Vibration	0.5 G sine, 5-500 Hz, 0.4 grms random	2.0 G sine, 5-500 Hz, 1.1 grms random
Airflow	Maximum - 101.94 cmh (60 cfm) Nominal - 74.76 cmh (44 cfm)	N/A
Heat dissipation	Maximum 22 ports: 590 BTU/hr	N/A
Operating noise	48.0 dBA	N/A

Power supply specifications (per PSU)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
XBR-1100WP SAC-R	150 W	100-240 VAC (nominal) 85-264 VAC (range)	50/60 Hz (nominal) 47-63 Hz (range)	12 - 5 A	Both AC lines are fused	Maximum of 60 A for period of 10 - 150 ms

Power consumption (typical configuration)

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade 7800	3.90 A 388 W 1524 BTU/hr	1.98 A 383 W 1307 BTU/h	Brocade 7800 does not support a DC power supply	2	SR optics, fans at nominal speed, 2 PSUs

Power consumption (maximum configuration)

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade 7800	4.56 A 454 W 1550 BTU/hr	2.34 A 452 W 1536 BTU/hr	N/A Brocade 7800 does not support -48 VDC power supply or DC power supply	2	SR optics, fans at high speed, 2 PSUs

Data port specifications (Fibre Channel)

Model	Port type	Number of ports	Description
Brocade 7800	40 GbE	2	Compatible with short range (SR) and long range (LR) optical QSFP+ transceivers
	10 GbE	16	Compatible with ultra short reach (USR), short reach (SR), and long reach (LR) optical SFP+ transceivers
	1 GbE	16	Compatible with -SX, -LX, and -CX (copper) SFP transceivers

Fibre Channel data transmission ranges

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
1	50	500 m (1,640 ft) (OM2)860 m (2,821 ft) (OM3)	N/A	N/A
	62.5	300 m (984 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	80 km (50 miles)
2	50	300 m (984 ft) (OM2)500 m (1,640 ft) (OM3)	N/A	N/A
	62.5	150 m (492 ft)	N/A	N/A

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
	9	N/A	10 km (6.2 miles)	80 km (50 miles)
4	50	150 m (492 feet) (OM2)380 m (1,246 ft) (OM3)	N/A	N/A
	62.5	70 m (230 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	80 km (50 miles)
8	50	50 m (164 ft) (OM2)150 m (492 ft) (OM3)	N/A	N/A
	62.5	21 m (69 feet)	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A

Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	Not supported	N/A
2	Not supported	N/A
3	UART1_TXD	Transmit data
4	GND	Logic ground
5	GND	Logic ground
6	UART1_RXD	Receive data
7	Not supported	N/A
8	Not supported	N/A

Serial port specifications (protocol)

Parameter	Value
Baud	9600

Parameter	Value
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Memory specifications

Memory	Type	Size
Boot	Flash	4 MB
Compact Flash	USB	1 GB
Control plane	DDR3 RDIMM SDRAM	TBD
Data plane	DDR3 RDIMM SDRAM	TBD

Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950-1-07/UL60950-1 - Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products - Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1, IEC 60950-1 Safety of Information Technology Equipment

Regulatory compliance (environmental)

- 2011/65/EU - Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS)
- 2012/19/EU - Waste electrical and electronic equipment (EU WEEE)
- 94/62/EC - packaging and packaging waste (EU)
- 2006/66/EC - batteries and accumulators and waste batteries and accumulators (EU battery directive)
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH)
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - U.S. Conflict Minerals
- 30/2011/TT-BCT - Vietnam circular
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China)
- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China)

Regulatory statements

BSMI statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求採取某些適當的對策。

Warning:

This is Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

China CC statement

China-CCC Warning statements

在维修的时候一定要断开所有电源 (English translation"disconnect all power sources before service")

For non tropical use:

安全说明和标记	汉文	"仅适用于非热带气候条件下安全使用。"
	藏文	[illegible]
	蒙古文	"ᠬᠡᠪᠢᠲᠢᠨ᠎ᠪᠤᠰ᠎ᠤᠨ᠎ᠭᠠᠵᠠᠷ᠎ᠳᠤ᠎ᠠᠶᠤᠯᠭᠤᠢ᠎ᠪᠠᠢᠳᠠᠯ᠎ᠳᠤ᠎ᠵᠠᠬᠢᠶᠠᠯᠠᠭᠳᠠᠵᠤ᠎ᠪᠤᠯᠤᠭᠠᠢ᠃"
	壮文	Dan hab yungh youq gij dienheiq diuzgen mbouj dwg diegndat haenx ancienz sawjyungh.
	维文	غەيرى ئىسسىق بەلباغ ھاۋا كىلىماتى شارائىتىدىلا بىخەتەر ئىشلەتكىلى بولىدۇ

For altitude 2000 meter and below:

安全说明和标记	汉文	仅适用于海拔2000m以下地区安全使用。
	藏文	[illegible]
	蒙古文	"ᠭᠤᠯᠤᠭᠤᠳᠡᠷ᠎ᠡᠴᠡ᠎ᠠᠭᠤᠯᠤᠭᠳᠠᠵᠤ᠎ᠪᠤᠢ᠎ᠭᠠᠵᠠᠷ᠎ᠳᠤ᠎ᠵᠠᠬᠢᠶᠠᠯᠠᠭᠳᠠᠵᠤ᠎ᠪᠤᠯᠤᠭᠠᠢ᠃"
	壮文	Dan hab yungh youq gij digih haijbaz 2000m doxroengz haenx ancienz sawjyungh.
	维文	دېڭىز يۈزىدىن 2000 مېتر تۆۋەن رايونلاردىلا بىخەتەر ئىشلەتكىلى بولىدۇ

Warning for Class A:

声 明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

English translation of above statement

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

CE Statement

ATTENTION
This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on this device contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EEC
- Low Voltage Directive (LVD) 2006/95/EC
- EN50082-2/EN55024:1998 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

KCC statement (Republic of Korea)

A급 기기 (업무용 방송통신기기): 이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

VCCI statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

Cautions and Danger Notices

Cautions

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

Ein Vorsichthinweis warnt Sie vor potenziellen Personengefahren oder Beschädigung der Hardware, Firmware, Software oder auch vor einem möglichen Datenverlust

Un message de mise en garde vous alerte sur des situations pouvant présenter un risque potentiel de dommages corporels ou de dommages matériels, logiciels ou de perte de données.

Un mensaje de precaución le alerta de situaciones que pueden resultar peligrosas para usted o causar daños en el hardware, el firmware, el software o los datos.

General cautions

CAUTION

Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

VORSICHT	Falls dieses Gerät verändert oder modifiziert wird, ohne die ausdrückliche Genehmigung der für die Einhaltung der Anforderungen verantwortlichen Partei einzuholen, kann dem Benutzer der weitere Betrieb des Gerätes untersagt werden.
MISE EN GARDE	Les éventuelles modifications apportées à cet équipement sans avoir été expressément approuvées par la partie responsable d'en évaluer la conformité sont susceptibles d'annuler le droit de l'utilisateur à utiliser cet équipement.
PRECAUCIÓN	Si se realizan cambios o modificaciones en este dispositivo sin la autorización expresa de la parte responsable del cumplimiento de las normas, la licencia del usuario para operar este equipo puede quedar anulada.

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°F).

VORSICHT	Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 40°C (104°F) installiert werden.

MISE EN GARDE	N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 40°C (104°F).
PRECAUCIÓN	No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 40°C (104°F).

CAUTION

Make sure the airflow around the front, sides, and back of the device is not restricted.

VORSICHT	Stellen Sie sicher, dass an der Vorderseite, den Seiten und an der Rückseite der Luftstrom nicht behindert wird.
MISE EN GARDE	Vérifiez que rien ne restreint la circulation d'air devant, derrière et sur les côtés du dispositif et qu'elle peut se faire librement.
PRECAUCIÓN	Asegúrese de que el flujo de aire en las inmediaciones de las partes anterior, laterales y posterior del instrumento no esté restringido.

Electrical cautions

CAUTION

Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

VORSICHT	Bevor Sie ein Kabel in einen Anschluss einstecken, entladen Sie jegliche im Kabel vorhandene elektrische Spannung, indem Sie mit den elektrischen Kontakten eine geerdete Oberfläche berühren.
MISE EN GARDE	Avant de brancher un câble à un port, assurez-vous de décharger la tension du câble en reliant les contacts électriques à la terre.
PRECAUCIÓN	Antes de conectar un cable en cualquier puerto, asegúrese de descargar la tensión acumulada en el cable tocando la superficie de conexión a tierra con los contactos eléctricos.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

VORSICHT	Falls kein Modul oder Netzteil im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.
MISE EN GARDE	Si vous n'installez pas de module ou de bloc d'alimentation dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.

PRECAUCIÓN	Si no instala un módulo o un fuente de alimentación en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento.

CAUTION

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

VORSICHT	Beachten Sie mechanischen Führungen an jeder Seite des Netzteils, das ordnungegemäß in die Führungen gesteckt werden muss. Das Netzteil darf niemals umgedreht eingesteckt werden.
MISE EN GARDE	Suivez attentivement les repères mécaniques de chaque côté du slot du bloc d'alimentation et assurez-vous que le bloc d'alimentation est bien inséré dans les repères. N'insérez jamais le bloc d'alimentation à l'envers.
PRECAUCIÓN	Siga cuidadosamente las guías mecánicas de cada lado de la ranura del suministro de energía y verifique que el suministro de energía está insertado correctamente en las guías. No inserte nunca el suministro de energía de manera invertida.

Danger Notices

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Ein Gefahrenhinweis warnt vor Bedingungen oder Situationen die tödlich sein können oder Sie extrem gefährden können. Sicherheitsetiketten sind direkt auf den jeweiligen Produkten angebracht um vor diesen Bedingungen und Situationen zu warnen.

Un paragraphe Danger indique des conditions ou des situations potentiellement mortelles ou extrêmement dangereuses. Des labels de sécurité sont posés directement sur le produit et vous avertissent de ces conditions ou situations

Una advertencia de peligro indica condiciones o situaciones que pueden resultar potencialmente letales o extremadamente peligrosas. También habrá etiquetas de seguridad pegadas directamente sobre los productos para advertir de estas condiciones o situaciones.

General dangers

DANGER

The procedures in this manual are for qualified service personnel.

GEFAHR	Die Vorgehensweisen in diesem Handbuch sind für qualifiziertes Servicepersonal bestimmt.
DANGER	Les procédures décrites dans ce manuel doivent être effectuées par un personnel de maintenance qualifié.

PELIGRO	Los procedimientos de este manual deben llevarlos a cabo técnicos cualificados.

Electrical dangers

DANGER

Remove both power cords before servicing.

GEFAHR	Trennen Sie beide Netzkabel, bevor Sie Wartungsarbeiten durchführen.
DANGER	Retirez les deux cordons d'alimentation avant toute maintenance.
PELIGRO	Desconecte ambos cables de alimentación antes de realizar reparaciones.

DANGER

Disconnect the power cord from all power sources to completely remove power from the device.

GEFAHR	Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird.
DANGER	Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif.
PELIGRO	Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente.

DANGER

Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.

GEFAHR	Stellen Sie sicher, dass die Stromkreise ordnungsgemäß geerdet sind. Benutzen Sie dann das mit dem Gerät gelieferte Stromkabel, um es an die Srromquelle anzuschließen.
DANGER	Vérifiez que les circuits de sources d'alimentation sont bien mis à la terre, puis utilisez lecordon d'alimentation fourni avec le dispositif pour le connecter à la source d'alimentation.
PELIGRO	Verifique que circuitos de la fuente de corriente están conectados a tierra correctamente; luego use el cordón de potencia suministrado con el instrumento para conectarlo a la fuente de corriente

DANGER

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

GEFAHR	Es besteht Explosionsgefahr, wenn ein unzulässiger Batterietyp eingesetzt wird. Verbrauchte Batterien sind entsprechend den geltenden Vorschriften zu entsorgen.
DANGER	Risque d'explosion en cas de remplacement de la pile par un modèle incorrect. Débarrassez-vous des piles usagées conformément aux instructions.
PELIGRO	Riesgo de explosión si se sustituye la batería por una de tipo incorrecto. Deshágase de las baterías usadas de acuerdo con las instrucciones.

Dangers related to equipment weight

DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

GEFAHR	Stellen Sie sicher, dass das Gestell für die Unterbringung des Geräts auf angemessene Weise gesichert ist, so dass das Gestell oder der Schrank nicht wackeln oder umfallen kann.
DANGER	Vérifiez que le bâti abritant le dispositif est bien fixé afin qu'il ne devienne pas instable ou qu'il ne risque pas de tomber.
PELIGRO	Verifique que el bastidor que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga.

Laser dangers

DANGER

All fiber-optic interfaces use Class 1 lasers.

GEFAHR	Alle Glasfaser-Schnittstellen verwenden Laser der Klasse 1.
DANGER	Toutes les interfaces en fibres optiques utilisent des lasers de classe 1.
PELIGRO	Todas las interfaces de fibra óptica utilizan láser de clase 1.